

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: Pituophis melanoleucus lodingi Blanchard

COMMON NAME: Black Pine Snake

LEAD REGION: 4

INFORMATION CURRENT AS OF: October 2005

**STATUS/ACTION:**

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition request a reclassification of a listed species?

**FOR PETITIONED CANDIDATE SPECIES:**

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

☒ Listing priority change

Former LP: 6

New LP: 3

Date when the species first became a Candidate (as currently defined): October 1, 1999

\_\_\_ Candidate removal: Former LP: \_\_\_

\_\_\_ A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

\_\_\_ U - Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

\_\_\_ F - Range is no longer a U.S. territory.

\_\_\_ I - Insufficient information exists on biological vulnerability and threats to support listing.

\_\_\_ M - Taxon mistakenly included in past notice of review.

\_\_\_ N - Taxon may not meet the Act's definition of "species."

\_\_\_ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Reptile - Colubridae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama, Louisiana, & Mississippi

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama (Clarke, Mobile, and Washington Counties) and Mississippi (Forrest, George, Greene, Harrison, Jones, Marion, Perry, Stone, and Wayne Counties)

LAND OWNERSHIP: Of the total habitat occupied by extant populations, 60 percent is on Federal land (DeSoto National Forest), 35 percent is on private land (25% in Mississippi, 10% in Alabama) and 5 percent is on other publicly-owned or managed lands (Marion County Wildlife Management Area/Mississippi; Scotch Wildlife Management Area, a conservation area managed by the Alabama Department of Transportation, and a conservation area owned by the city of Citronelle/Alabama).

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LEAD FIELD OFFICE CONTACT: Jackson, Mississippi Field Office, Linda LaClaire, 601/321-1126, Linda\_LaClaire@fws.gov

#### BIOLOGICAL INFORMATION:

##### Species Description

Pine snakes (genus Pituophis) are large, short-tailed, powerful constricting snakes with keeled scales and disproportionately small heads (Conant and Collins 1991). Their snouts are pointed and they are good burrowers. Black pine snakes are distinguished from other pine snakes by

being dark brown to black both on the upper and lower surfaces of their bodies. There is considerable individual variation in adult coloration (Vandeventer and Young 1989). Some adults have russet-brown snouts. They may also have white scales on their lips, throat, and ventral surface (J. Lee, The Nature Conservancy, *in. litt.* 2005). In addition, there may also be a vague pattern of blotches on the end of the body approaching the tail. Adult black pine snakes range from 48 to 74 inches (122 to 188 centimeters) (Conant and Collins 1991, Mount 1975). Young black pine snakes often have a blotched pattern, typical of other pine snakes, which darkens with age.

### Taxonomy

There are three recognized subspecies of *Pituophis melanoleucus* (pinesnakes) distributed across the eastern United States (Crother 2000, Rodriguez-Robles and De Jesus-Escobar 2000). The black pine snake, *P. m. lodingi*, was originally described by Blanchard (1924). It is geographically isolated from all other pine snakes. However, there is evidence that the black pine snake was in contact with other pine snakes in the past. A form intermediate between the black pine snake and the Florida pine snake (*P. m. mugitus*) occurs in Baldwin and Escambia counties in Alabama and Escambia County in Florida. These snakes are separated from populations of the “true” black pine snake by the extensive Texas-Mobile River Delta and the Alabama River (Duran 1998b). The available taxonomic information on *P. m. lodingi* has been carefully reviewed and we conclude that this subspecies is a valid taxon.

### Habitat

Black pine snakes are endemic to the upland longleaf pine forests that once covered the southeastern United States. Habitat for these snakes consists of sandy, well-drained soils with an overstory of longleaf pine, a fire suppressed mid-story, and dense herbaceous ground cover (Duran 1998b). Duran (1998a) conducted a radio-telemetry study of the black pine snake that provided data on habitat use. Snakes in this study were usually located on well-drained, sandy-loam soils on hilltops, ridges, and toward the tops of slopes. They were rarely found in riparian areas, hardwood forests, or closed canopy conditions. More than half of the time, black pine snakes were located underground, usually in the trunks or root channels of rotting pine stumps. During a study initiated in 2004, individual pine snakes were observed more frequently in riparian areas, hardwood forests, and pine plantations than in Duran’s (1998b) study, but they repeatedly used the same pine stump from year to year indicating considerable longleaf pine forest site fidelity (Lee, *in. litt.* 2005). Several juvenile snakes that were radio-tracked during this same study have been observed using mole or other small mammal burrows rather than the bigger stump holes used by adult snakes (Lee, *in. litt.* 2005).

### Life History

Black pine snakes are active during the day but only rarely at night. They are accomplished burrowers. Their pointed snout and enlarged rostral scale (the scale at the tip of their snout) are effective for tunneling in loose soil and also may be used for digging nests and excavating

rodents for food (Ernst and Barbour 1989). In addition to rodents, wild black pine snakes have been reported to eat nestling rabbits and quail (Vandevert and Young 1989). In captivity, they will eat rats, mice, and chicks (Vandevert and Young 1989). During a field study of black pine snakes in Mississippi, the hispid cotton rat was the most frequently trapped small mammal within black pine snake home ranges (Duran and Givens 2001). As a result, this rat may represent an essential component of the snake's diet (Duran and Givens 2001).

Duran and Givens (2001) estimated the size of the black pine snake home range to be 117.4 acres (47.5 hectares) using data obtained during their radio-telemetry study. Observations made during this study also provided some evidence of territoriality in the black pine snake.

Neither breeding nor egg-laying have been observed in the wild. However, captive breeding has been successfully induced by providing three to four months of cooling at 50 to 55 degrees Fahrenheit (F) (10 to 13 degrees Celsius (C)) in conjunction with a reduction in daylight hours (Vandevert and Young 1989). Courtship was observed from mid-May and continued into the first week of June. Clutches of 7 to 11 large eggs were laid about 50 days after breeding and hatched after 60 days of incubation at 84 degrees F (29 degrees C) (Vandevert and Young 1989). Hatchlings averaged 18 inches (46 centimeters) at birth (Vandevert and Young 1989).

Longevity of wild black pine snakes is unknown. The longevity record for a captive black pine snake is 12 years, 7 months (Snider and Bowler 1992).

Predators of the black pine snake have not been documented, but the species' defensive posture when disturbed by a human has been described. When threatened, it throws itself into a coil, vibrates its tail rapidly, strikes repeatedly, and utters a series of loud hisses (Ernst and Barbour 1989). Generally this display is a bluff, but some individuals will bite (Ernst and Barbour 1989).

### Historical Range/Distribution

There are historical records for the black pine snake from one parish in Louisiana (Washington Parish), 14 counties in Mississippi (Forrest, George, Greene, Harrison, Jackson, Jones, Lamar, Lauderdale, Marion, Pearl River, Perry, Stone, Walthall, and Wayne Counties) and 3 counties in Alabama west of the Mobile River Delta (Clarke, Mobile, and Washington Counties).

### Current Range/Distribution

Based on a status survey, Duran (1998b) concluded that black pine snakes have been extirpated from Louisiana and from two counties (Lauderdale and Walthall) in Mississippi. They have not been reported west of the Pearl River in either Mississippi or Louisiana in 24 years (Duran 1998b). There are no recent (post-1979) records for three additional Mississippi counties (Greene, Jackson, and Lamar) where they once occurred. Surveys indicated that black pine snakes remain in 3 out of 3 counties in Alabama (Clarke, Mobile, and Washington) and 9 out of 14 counties in Mississippi (Forrest, George, Harrison, Jones, Marion, Pearl River, Perry, Stone, and Wayne). However, the distribution of populations within these counties has become highly

restricted due to the fragmentation of the remaining longleaf pine habitat. In seven of the nine occupied Mississippi counties, populations of black pine snakes are concentrated on the DeSoto National Forest. Black pine snake populations outside of the DeSoto National Forest in Mississippi, and in Alabama, appear to be small and isolated on islands of suitable longleaf pine habitat (Duran 1998b).

#### Population Estimates/Status

Duran and Givens (2001) reported the results of a habitat assessment of all known black pine snake records. Habitat suitability of the sites was based on how the habitat compared to that selected by black pine snakes in a recently completed telemetry study (Duran 1998b). A probability of occurrence rating was derived for each locality using a combination of the habitat suitability rating and data on how recently and/or frequently black pine snakes had been recorded at the site. Of the 157 known records, it was determined that black pine snakes probably no longer occurred at 53 sites (34% of total). Comparing individual records gives equal weight to the many occurrences that have been recently recorded in areas of pine snake abundance, to the sparse records from areas where pine snakes have been extirpated. This greatly underestimates population losses. Removing the more recent records from 1990 to the present eliminates significant bias because during this period a concerted effort was made to locate black pine snakes, especially in areas of quality habitat. Subtracting these records would leave a total of 83 sites, which could be considered “historical” records. Of these, black pine snakes probably no longer occur at 42 (51% of historical records). Black pine snake habitat continues to be lost and degraded.

The black pine snake is a difficult species to locate even in areas where it is known to occur. As a result, the following estimate of the number of current populations should probably be considered a minimum. “Current populations” were documented in one of two ways using records from 1990 to the present. The first way was to assume a population based on a known occurrence of the species. The second was to make an assumption of population presence due to the observance of excellent habitat in the vicinity of an earlier record (pre-1990). The boundary enclosing an individual population was defined as the area of suitable contiguous habitat through which unrestricted gene flow was possible. Using data from Duran and Givens (2001), Hart (2002), B. Porter, U.S. Fish and Wildlife Service, *in. litt.* (2005), and D. Smith, University of Southern Mississippi, *in. litt.* (2005), it can be estimated that there are 22 extant populations of black pine snakes. Ten of these populations occur in Alabama and twelve occur in Mississippi. Five populations occur on state or city-managed land (23%), eleven populations occur on private land (50%), and six populations occur on Federal land (27%). The six populations on Federal land (DeSoto National Forest) contain the majority of the known black pine snake records and most of the acreage of excellent suitable habitat remaining for the species. Three gopher tortoise mitigation banks are being operated in Mobile County, Alabama, and these sites represent the best opportunity for long-term survival of the black pine snake in the state of Alabama.

## THREATS:

### A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The historical distribution of the black pine snake is highly correlated with the historical range of the longleaf pine ecosystem in extreme southeastern Louisiana, southern Mississippi, and extreme Southwestern Alabama (Duran 1998b). Today, the remaining longleaf pine forest in the southeast has been reduced to less than 5 percent of its original extent (Frost 1993, Outcalt and Sheffield 1996). In the range of the black pine snake, longleaf pine is now largely confined to isolated patches on private land and the DeSoto National Forest in Mississippi. Black pine snake habitat has been eliminated through land use conversions, primarily urban development and conversion to agriculture and pine plantations. Most of the remaining patches of longleaf pine on private land are fragmented, degraded, second-growth forests.

Conversion of longleaf pine forest to pine plantation often reduces the quality and suitability of a site for black pine snakes. Duran (1998a) found that black pine snakes prefer open canopies, reduced mid-stories, and dense herbaceous understories. He also found that these snakes are frequently underground in rotting pine stumps. Forest management strategies such as fire suppression (see Factor E), increased stocking densities, bedding, and removal of downed trees and stumps all contribute to degradation of habitat attributes preferred by black pine snakes.

Fragmentation and degradation of longleaf pine habitat is continuing. The coastal counties of southern Mississippi and Mobile County, Alabama, are being developed at a rapid rate due to increases in the human population. Urbanization appears to have reduced historical black pine snake populations in Mobile County by approximately 50 percent (Duran 1998b). Much of this reduction has occurred in the last 15 to 20 years. For example, Jennings and Fritts (1983) reported that, in the 1980's, the black pine snake was one of the most frequently encountered snakes on the Environmental Studies Center (Center) in Mobile County. Urban development has now engulfed lands adjacent to the Center and black pine snakes have not been seen on the property in the last 16 years (D. Myers, pers. comm. in Duran 1998b). Black pine snakes were occasionally seen in the 1970's on the campus of the University of South Alabama in western Mobile (Duran 1998b). They have not been observed there in over a decade (D. Nelson, pers. comm. in Duran 1998b).

### B. Overutilization for commercial, recreational, scientific, or educational purposes.

Direct take of black pine snakes for recreational, scientific, or educational purposes is not currently considered to be a threat. However, there is some indication that collecting for the pet trade may be a problem (Duran 1998b).

### C. Disease or predation.

Disease and predation are not presently considered to be threats to the black pine snake.

### D. The inadequacy of existing regulatory mechanisms.

In Mississippi, the black pine snake is classified as endangered by the Mississippi Department of Wildlife, Fisheries and Parks (Mississippi Museum of Natural Science 1996). In Alabama, it is

protected as a non-game animal. Both Mississippi and Alabama regulations restrict collecting of the species. However, they do nothing to alleviate the loss of habitat that has caused the decline of this snake.

The best remaining habitat for the black pine snake is on the Desoto National Forest in Mississippi. Forestry management programs, which protect gopher tortoises and red-cockaded woodpeckers or reestablish longleaf pine on the Desoto National Forest, are of benefit to the snakes. Nevertheless, the Desoto National Forest has no management program in place specific to the black pine snake. There are no restrictions on activities such as stump removal, which may have been detrimental to black pine snakes in the past (Duran 1998b). Multiple use priorities, such as timber production, and military and recreational use, do not necessarily mean that protection of the black pine snake is at the forefront.

E. Other natural or manmade factors affecting its continued existence.

Fire is needed to maintain the longleaf pine ecosystem. Fire suppression has been considered the primary reason for the degradation of the remaining longleaf pine forest. It is a contributing factor in reducing the quality and quantity of available habitat for the black pine snake. Lowered fire frequencies and reductions in average area burned per fire event (strategies often used in management of pine plantations) produce sites with thick mid-stories. These areas are avoided by black pine snakes (Duran 1998a). During a recent study using radio-telemetry to track black pine snakes, a prescribed burn bisected the home range of one of the study animals. The snake spent significantly more time in the recently burned area than in the area that had not been burned in several years (D. Smith, University of Southern Mississippi, *in litt.* 2005).

Habitat fragmentation within the longleaf pine ecosystem threatens the continued existence of all the black pine snake populations on private lands. This is frequently the result of urban development, conversion of longleaf pine sites to pine plantations, and the associated increases in number of roads. When patches of available habitat become separated beyond the dispersal range of a species, populations are more sensitive to genetic, demographic, and environmental variability and extinction becomes possible. This is likely the cause for the extirpation of the black pine snake in Louisiana and the loss of populations in two (and possibly a total of five) counties in Mississippi (Duran pers. comm. 1999). Roads surrounding and traversing the remaining habitat pose a threat to the black pine snake. Lalo (1987) estimated that one million individual vertebrates are killed per day on roads in the United States. Black pine snakes frequent the sandy hilltops and ridges where roads are most frequently sited. During Duran's (1998a) study, 17 percent of the black pine snakes with transmitters were killed while attempting to cross a road.

In many parts of Louisiana, Mississippi, and Alabama, there is a lack of understanding of the importance of snakes to a healthy ecosystem. Snakes are often killed intentionally when they are observed. During his study, Duran (1998a) found a dead black pine snake that had been shot. In another instance, the tracks of a 4-wheel drive vehicle could be seen swerving to the wrong side of the road and into a ditch where a dead black pine snake was found. As development pressures increase on the remaining black pine snake's habitat, especially in Mobile County, Alabama,

human/snake interactions will increase and frequently result in the death of the snake.

Duran (1998a) suggested that reproductive rates of wild black pine snakes may be low. Thus, the loss of mature adults, through road mortality or direct killing, increases in significance. As existing occupied habitat becomes reduced in quantity and quality, low reproductive rates threaten population viability.

## CONSERVATION MEASURES PLANNED OR IMPLEMENTED

There have been preliminary discussions with the U.S. Forest Service concerning development of a Memorandum of Understanding for the black pine snake. This agreement would identify management needed to protect the snake on the DeSoto National Forest in Mississippi.

## SUMMARY OF THREATS

Habitat loss, fragmentation, and degradation continue to represent the biggest threats to the black pine snake. Associated threats include fire suppression, urban development, increases in the number and width of roads, and intentional killing of snakes. Low reproductive rates increase the significance of each of these threats to long-term population viability.

## LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		Species	2
		<b>Subspecies/population</b>	<b>3*</b>
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:



*Magnitude:* Most of the longleaf pine habitat of the black pine snake has been destroyed. The habitat that remains has been degraded. Currently occupied habitat continues to be degraded due to fire suppression, incompatible forestry practices, and urbanization.

*Imminence:* Habitat loss (see contributing factors listed above) is continuing at a slow and gradual rate. Although habitat in private ownership is being lost at a faster rate than that in public ownership, even on public lands the fire frequency has not been sufficient to prevent hardwood encroachment and habitat loss. Due to the ongoing nature of this habitat loss, the threats to the species are imminent.

Rationale for Change in Listing Priority Number: Clarification provided to us this FY on the rationale for determining the immediacy of threats states that if a threat is currently occurring, the threat is to be considered imminent. Therefore, although there is no actual change in threats over the past year, habitat loss does represent an ongoing threat to the black pine snake and we have changed the Listing Priority Number to: 3.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. Although the threat to the black pine snake is high because of habitat loss, this species is not in immediate danger of becoming extinct.

DESCRIPTION OF MONITORING: Since the last update of this assessment form, species experts and appropriate individuals with State and Federal agencies have been contacted concerning the black pine snake and asked to provide any new relevant literature and/or data. These individuals, their affiliation, and date of contact are as follows: Jim Lee, The Nature Conservancy, October 7, 2005; Danna Smith, University of Southern Mississippi, September 30, 2005; Mark Sasser, Alabama Department of Conservation and Natural Resources (ADCNR), October 14, 2005; Steve Rider, ADCNR, October 14, 2005; Greg Lein, ADCNR, Natural Heritage Program, October 14, 2005; Tom Mann, Mississippi Department of Wildlife, Fisheries, and Parks, Natural Heritage Program, September, 27, 2005; Ines Maxit, Louisiana Department of Wildlife and Fisheries, Natural Heritage Program, October 19, 2005; Bruce Porter, U.S. Fish and Wildlife Service, October 11, 2005. New records for the species have been added to the locality database from observations shared by these agencies and researchers. A study initiated in 2004 by The Nature Conservancy on Camp Shelby, Mississippi, is continuing and will provide information on black pine snake daily and seasonal activity patterns in some of the species' best remaining habitat. Data on habitat use will be used to provide guidance for management to benefit the black pine snake on Camp Shelby. Another study was initiated in March 2005 by researchers at the University of Southern Mississippi to obtain more current information on the status and distribution of the black pine snake in Mississippi on private and public lands (other than Camp Shelby). Data on ecology and life history will be gathered through the study of snakes implanted with radio-transmitters in habitat qualitatively and quantitatively different from that on Camp Shelby. This will allow a broader characterization of habitat parameters that

support, or fail to support, black pine snake populations.

#### COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Alabama and Mississippi

Indicate which State(s) did not provide any information or comments: Louisiana

#### LITERATURE CITED:

- Blanchard, F.N. 1924. A name for the black Pituophis from Alabama. Papers Michigan Academy of Science, Arts, and Letters 4:531-532.
- Conant, R. And J.T. Collins. 1991. A field guide to the reptiles and amphibians of Eastern and Central North America. Houghton Mifflin Co., Boston, Massachusetts. 450 pp.
- Crother, B.I. (ed.) 2000. Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. SSAR Herpetological Circular 29, Shoreview, MN. iv + 82 pp.
- Duran, C.M. 1998a. Radio-telemetric study of the black pine snake (Pituophis melanoleucus lodingi) on the Camp Shelby Training site. Report to the Mississippi Natural Heritage Program and the Mississippi National Guard. 44 pp.
- Duran, C.M. 1998b. Status of the black pine snake (Pituophis melanoleucus lodingi Blanchard). Unpublished report submitted to U.S. Fish and Wildlife Service, Jackson, MS. 32 pp.
- Duran, C.M. and R.R. Givens. 2001. Quantitative and photographic analyses of the status of the black pine snake (Pituophis lodingi). Unpublished report submitted to U.S. Fish and Wildlife Service, Jackson, MS. 35 pp. + appendices.
- Ernst, C.H. and R.W. Barbour. 1989. Snakes of eastern North America. George Mason University Press, Fairfax, VA. 282 pp.
- Frost, C.C. 1993. Four centuries of changing landscape patterns in the longleaf pine ecosystem. Pgs. 17-43 In: S.M. Hermann (ed.), Proceedings of the Tall Timbers Fire Ecology Conference, No. 18, the Longleaf Pine Ecosystem: ecology, restoration and management. Tall Timbers Research Station, Tallahassee, FL.
- Hart, B. 2002. Status survey of the eastern indigo snake (Drymarchon couperi Holbrook), black pine snake Pituophis melanoleucus lodingi Blanchard), and southern hognose snake (Heterodon simus Linnaeus) in Alabama. Unpublished report prepared for the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries, Montgomery, AL. 49 pp.

- Jennings, R.D. and T.H. Fritts. 1983. The status of the black pine snake Pituophis melanoleucus lodingi and the Louisiana pine snake Pituophis melanoleucus ruthveni. U.S. Fish and Wildlife Service and University of New Mexico Museum of Southwestern Biology, Albuquerque, NM. 32 pp.
- Lalo, J. 1987. The problem of roadkill. American Forests 50:50-52.
- Mississippi Museum of Natural Science (MMNS). 1992. Endangered species of Mississippi, Mississippi Department of Wildlife, Fisheries, and Parks, Jackson, MS. 80 pp.
- Mount, R.H. 1975. The reptiles and amphibians of Alabama. Auburn Printing Company, Auburn, AL. 347 pp.
- Outcalt, K.W. and R.M. Sheffield. 1996. The longleaf pine forest: Trends and current conditions. USDA Forest Service, Southern Research Station, Resource Bulletin SRS-9, Asheville, NC. 23 pp.
- Rodriguez-Robles, J.A. and J.M De Jesus-Escobar. 2000. Molecular systematics of New World gopher, bull, and pinesnakes (Pituophis: Colubridae), a transcontinental species complex. Molecular Phylogenetics and Evolution 14:35-50.
- Snider, A.T. and J.K. Bowler. 1992. Longevity of reptiles and amphibians in North American collections. Second edition. Society for the Study of Amphibians and Reptiles, Herpetological Circular No. 21, Lawrence, KS. 40 pp.
- Vandeventer, T.L. and R.A. Young. 1989. Rarities of the longleaf: the black and Louisiana pine snakes. Vivarium 1:32-36.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Jeffrey M. Fleming 11/16/2005  
Acting Regional Director, Fish and Wildlife Service Date



Concur: \_\_\_\_\_ August 23, 2006  
Director, Fish and Wildlife Service Date

Do Not Concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Date of annual review: October 2005

Conducted by: Jackson, Mississippi Field Office